

**REMARKS**

An excess claim fee payment letter is submitted herewith for four (4) excess total claims.

Claims 1-29 are pending in the present application.

Applicants gratefully acknowledge that claims 4-8, 14-15, and 20-24 would be allowable if rewritten in independent form, and if the rejection under 35 U.S.C. § 112, second paragraph, is overcome. However, for the following reasons, Applicants submit that all of the claims (i.e., claims 1-25) are in condition for allowance.

New claims 26-29 are added to provide more varied protection for the invention, as described in the original specification and drawings.

Claims 1, 2, 4, 6-16, 18, 20, and 22-25 have been amended to make minor editorial changes in conformance with U.S. Patent practice.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Allowable claims 4-8 and 20-24 stand rejected under 35 U.S.C. § 112, second paragraph.

With respect to the prior art rejections, claims 1-3, 9-12, 16-19, and 25 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Rees (U.S. Patent No. 4,998,234). Claim 13 stands rejected under 35 U.S.C. § 103(a) as being obvious over Rees.

These rejections are respectfully traversed in the following discussion.

## I. THE CLAIMED INVENTION

In an illustrative, non-limiting aspect of the invention as defined, for example, by independent claim 1, a signal synthesizing apparatus includes an optical pickup including a plurality of light receiving planes for receiving a light beam returning from an optical disc when a reading beam of light is radiated to the optical disc, and for producing a plurality of signals, adjusting means for adjusting signal levels of the plurality of signals such that each of the signal levels of the plurality of signals becomes equal to a reference level determined from at least one of the signal levels of the plurality of signals, and synthesizing means for synthesizing the plurality of signals after the signal levels of the plurality of signals are adjusted by the adjusting means to obtain a synthesized signal.

In another exemplary aspect of the invention as defined by independent claim 10, a signal synthesizing method includes receiving a light beam returning from an optical disc upon radiating a reading beam of light to the optical disc, producing a plurality of signals in accordance with optical intensities of the received light beam, adjusting signal levels of the plurality of signals such that each of the signal levels of the plurality of signals becomes equal to a reference level determined from at least one of the signal levels of the plurality of signals, and synthesizing the plurality of signals after the signal levels are adjusted to obtain a synthesized signal.

In another exemplary aspect of the invention as defined by independent claim 17, an apparatus includes a plurality of detectors for receiving a light beam returning from an optical disc when a reading beam of light is radiated to the optical disc, and for producing a plurality of signals, and a level adjusting circuit for adjusting signal levels of the plurality of signals such

that each of the signal levels of the plurality of signals becomes equal to a reference level determined from at least one of the signal levels of the plurality of signals.

Generally, it is not possible for the light receiving planes to have the same light receiving characteristics. Therefore, conventional devices have relied on variable gain amplifiers to adjust signal levels of the returning light beam segments such that the signal levels of the returning light beam segments become equal to a predetermined reference value (e.g. see specification at page 2, lines 1-11). However, as mentioned above, a plurality of light receiving elements which constitute each light receiving plane have great variation in optical and physical characteristics. In addition, the reference value mentioned above cannot be separated from the signal levels of the returning light beam segments in order to insure an appropriate functioning of the variable gain amplifiers. This imposes considerable limitations on determination (selection) of the reference value and design of a feedback circuit including the variable gain amplifiers (e.g., see specification at page 2, lines 12-21).

The claimed invention, on the other hand, provides a novel and unobvious signal synthesizing apparatus for an optical disc which can be easily designed and which has a relatively simple circuit structure (e.g., see specification at page 2, lines 23-25).

For example, according to the claimed invention, since the reference value is decided on the basis of the signal level(s) of the returning light beam segment(s), there is no need to separately or specially prepare a reference value. Therefore, the signal level adjustment is simplified. Further, the whole circuit structure is simplified. This contributes to a reduction of manufacturing cost of the signal synthesizing apparatus (e.g., see specification at page 3, lines 11-18).

## II. THE 35 U.S.C. § 112 REJECTION

Claims 4-8 and 20-24 stand rejected under 35 U.S.C. § 112, second paragraph.

Particularly, the Examiner alleges that “the plurality of variable gain amplifiers” lacks antecedent basis (e.g., see claim 4 at line 9, as set forth above). However, Applicants respectfully submit that “a plurality of variable gain amplifiers” is introduced in claims 4 and 20 prior to the subject references identified by the Examiner (e.g., see claim 4 at line 6 and claim 20 at line 5, as set forth above).

Thus, Applicants submit that no amendment is necessary because proper antecedent basis has been provided for these features. Accordingly, the Examiner is requested to withdraw this rejection.

## III. THE PRIOR ART REJECTIONS

Claims 1-3, 9-12, 16-19, and 25 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Rees. Claim 13 stands rejected under 35 U.S.C. § 103(a) as being obvious over Rees.

Applicant submits that there are elements of the claimed invention which are neither disclosed nor suggested by Rees. Therefore, Applicants respectfully traverse these rejections.

For example, independent claim 1 recites, *inter alia*, a signal synthesizing apparatus including:

an optical pickup including a plurality of light receiving planes for receiving a light beam returning from an optical disc when a reading beam of light is radiated to the optical disc, and for producing a plurality of signals;

adjusting means for adjusting signal levels of the plurality of signals such that each of the signal levels of the plurality of signals becomes equal to a reference level determined from at least one of the signal levels of the plurality of signals; and

synthesizing means for synthesizing the plurality of signals after the signal levels of the plurality of signals are adjusted by the adjusting means to obtain a synthesized signal (emphasis added).

Thus, the claimed invention, as defined, for example, by independent claim 1, provides a novel and unobvious signal synthesizing apparatus for an optical disc which can be easily designed and which has a relatively simple circuit structure (e.g., see specification at page 2, lines 23-25).

For example, according to the claimed invention, since the reference value is decided on the basis of the signal level(s) of the returning light beam segment(s), there is no need to separately or specially prepare a reference value. Therefore, the signal level adjustment is simplified. Further, the whole circuit structure is simplified. This contributes to a reduction of manufacturing cost of the signal synthesizing apparatus (e.g., see specification at page 3, lines 11-18).

In the present invention, the specification discloses adjusting means for adjusting signal levels of the plurality of signals such that each of the signal levels of the plurality of signals becomes equal to a reference level determined from at least one of the signal levels of the plurality of signals (e.g., see specification at page 4, lines 24-27). The adjusting means may include, among others things, level detection circuits (e.g., 11, 13, 16, 19, etc.), variable gain amplifiers (e.g., 12, 15, 18, etc.), and comparators (e.g., 14, 17, 20, etc.) (e.g., see specification at page 6, line 6, to page 8, line 11).

In comparison, Rees clearly does not disclose or suggest any structure, equivalents thereof, or identity of function necessary for the claimed “adjusting means”.

Instead, Rees discloses that all of the signals are:

*summed together in a summation circuit 116 and passed through a low-pass filter 118 to give a reference signal which is log ABCD. Low pass filter 118 is provided to match the frequency response of the reference signal to the frequency response of the individual log signals in subtracting amplifiers 120, 122, 124, and 126. Each of the log signals is subtracted from the reference signal in amplifiers 120, 122, 124, and 126. Thus, each log signal is referenced to an average of the log signals rather than being referenced to zero. All of the log signals are close to the same DC offset and do not vary by very much from that offset. Accordingly, by removing the DC offset and referencing the signal to that DC offset, the variations are proportionately larger, thus improving sensitivity.*

(see Rees at column 6, lines 36-52; emphasis Applicants).

For the foregoing reasons, Applicants respectfully submit that Rees does not disclose or suggest all of the novel and unobvious features, including, for example, “adjusting means for adjusting signal levels of the plurality of signals such that each of the signal levels of the plurality of signals becomes equal to a reference level determined from at least one of the signal levels of the plurality of signals”, as defined by independent claim 1 (emphasis added).

Indeed, Rees does not disclose or suggest a signal synthesizing apparatus for an optical disc which can be easily designed and which has a relatively simple circuit structure (e.g., see specification at page 2, lines 23-25).

In comparison, in the claimed invention, since the reference value is decided on the basis of the signal level(s) of the returning light beam segment(s), there is no need to separately or specially prepare a reference value, as in Rees. Therefore, according to the claimed invention, the signal level adjustment is simplified. Further, the whole circuit structure is simplified. This

contributes to a reduction of manufacturing cost of the signal synthesizing apparatus (e.g., see specification at page 3, lines 11-18).

Somewhat similarly, independent claim 10 recites, *inter alia*, a signal synthesizing method including:

- receiving a light beam returning from an optical disc upon radiating a reading beam of light to the optical disc;
- producing a plurality of signals in accordance with optical intensities of the received light beam;
- adjusting signal levels of the plurality of signals such that each of the signal levels of the plurality of signals becomes equal to a reference level determined from at least one of the signal levels of the plurality of signals;
- and
- synthesizing the plurality of signals after the signal levels are adjusted in said adjusting to obtain a synthesized signal (emphasis added).

On the other hand, independent claim 17 recites, *inter alia*, an apparatus comprising:

- a plurality of detectors for receiving a light beam returning from an optical disc when a reading beam of light is radiated to the optical disc, and for producing a plurality of signals; and
- a level adjusting circuit for adjusting signal levels of the plurality of signals such that each of the signal levels of the plurality of signals becomes equal to a reference level determined from at least one of the signal levels of the plurality of signals (emphasis added).

Applicants respectfully submit that Rees does not disclose or suggest “adjusting signal levels” as defined by independent claim 10, or “a level adjusting circuit” as defined by independent claim 17.

Instead, Rees discloses that all of the signals are “summed together in a summation circuit 116 and passed through a low-pass filter 118 to give a reference signal which is log *ABCD*” (see Rees at column 6, lines 36-38; emphasis Applicants).

Thus, Applicants respectfully submit that Rees does not disclose or suggest all of the features of independent claims 1, 10, and 17.

On the other hand, Applicants submit that claims 2, 3, 9-13, 16-19, and 25 are patentable over Rees by virtue of their dependency from independent claims 1, 10, and 17, respectively, as well as for the additional features recited therein.

For example, claim 2 recites, *inter alia*, that “the reference level comprises a signal level of one of the plurality of signals, and the adjusting means adjusts signal levels of others of the plurality of signals such that each of the signal levels of the others of the plurality of signals becomes equal to the signal level of the one of the plurality of signals” (emphasis added).

In comparison, Rees discloses that all of the signals are “*summed together in a summation circuit 116 and passed through a low-pass filter 118 to give a reference signal which is log ABCD*” (see Rees at column 6, lines 36-38; emphasis Applicants).

Thus, Applicants submit that Rees does not disclose or suggest the claimed invention defined, for example, by claim 2.

As another example, claim 11 recites, *inter alia*, that the “reference level includes a signal level of one of the plurality of signals”, and that the step of adjusting signal levels “adjusts signal levels of others of the plurality of signals such that each of the signal levels of the others of the plurality of signals becomes equal to the signal level of the one of the plurality of signals”.

As mentioned above, Rees discloses that all of the signals are “*summed together in a summation circuit 116 and passed through a low-pass filter 118 to give a reference signal which is log ABCD*” (see Rees at column 6, lines 36-38; emphasis Applicants).

On the other hand, claim 12 recites, *inter alia*, that the step of adjusting “includes the substep of using a peak level of the one of the plurality of signals as the reference level signal”.

Again, Rees discloses that all of the signals are “*summed together in a summation circuit 116 and passed through a low-pass filter 118 to give a reference signal which is log ABCD*” (see Rees at column 6, lines 36-38; emphasis Applicants).

As yet another example, claim 19 recites, *inter alia*, that the level adjusting circuit includes “a relay circuit for producing a reference level signal representing the signal level of the one of the plurality of signals; and an amplifying relay circuit for producing subordinate level signals representing the signal levels of the others of the plurality of signals respectively, and adjusting the signal levels of the others of the plurality of signals such that each of the subordinate level signals becomes equal to the reference level signal.”

In comparison, Rees discloses only that all of the signals are “*summed together in a summation circuit 116 and passed through a low-pass filter 118 to give a reference signal which is log ABCD*” (see Rees at column 6, lines 36-38; emphasis Applicants).

For the foregoing reasons, Applicants respectfully submit that there are elements of the claimed invention that are not disclosed or suggested by Rees, or for that matter, a signal synthesizing apparatus for an optical disc which can be easily designed and which has a relatively simple circuit structure (e.g., see specification at page 2, lines 23-25).

In comparison, in the claimed invention, since the reference value is decided on the basis of the signal level(s) of the returning light beam segment(s), there is no need to separately or specially prepare a reference value. Therefore, the signal level adjustment is simplified. Further,

the whole circuit structure is simplified. This contributes to a reduction of manufacturing cost of the signal synthesizing apparatus (e.g., see specification at page 3, lines 11-18).

Accordingly, the Examiner is respectfully requested to withdraw these rejections and permit claims 1-3, 9-13, 16-19, and 25 to pass to immediate allowance.

#### **IV. NEW CLAIMS**

New claims 26-29 are added to provide more varied protection for the invention.

Applicants submit that claims 26-29 are patentable over the prior art for somewhat similar reasons as those set forth above. Accordingly, the Examiner is requested to pass claims 26-29 to allowance.

#### **V. FORMAL MATTERS AND CONCLUSION**

The Office Action objects to the specification (particularly, the Title of the Invention). The Title of the Invention is amended above to obviate this objection. Accordingly, the Examiner is requested to withdraw this objection.

The Office Action also objects to the claims 3-8 and 19-24 because it is allegedly unclear how the “a reference signal” of claims 3 and 19 is different from the reference signal already defined in claims 1 and 17, respectively.

Applicants note that claim 3 recites, *inter alia*, “a relay circuit for producing a reference level signal representing the signal level of the one of the plurality of signals, and directly transferring the one of the plurality of signals to the synthesizing means” (emphasis added). That is, the reference level signal *represents* the signal level of the one of the signals (e.g., one (for

example, signal A) of the four signals (A-D) is used as the reference level signal) which the other signals are adjusted to be equal to (e.g., signals B-D are adjusted to be equal to the reference level signal, which represents signal A).

Thus, Applicants respectfully submit that claims 4 and 19 are clear and sufficiently definite to allow one of ordinary skill to know the metes and bounds of the invention.

Accordingly, the Examiner is requested to withdraw this objection.

The Examiner is requested to acknowledge receipt of and approve the drawing filed on April 26, 2002.

In view of the foregoing, Applicant submits that claims 1-29, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.


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The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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